



UNITED STATES PATENT AND TRADEMARK OFFICE

cy
UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/925,673

08/09/2001

Masakatsu Kaneko

01376CIP/HG

4630

1933

7590

08/01/2006

FRISHAUF, HOLTZ, GOODMAN & CHICK, PC

220 Fifth Avenue

16TH Floor

NEW YORK, NY 10001-7708

EXAMINER

KRISHNAN, GANAPATHY

ART UNIT

PAPER NUMBER

1623

DATE MAILED: 08/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/925,673	KANEKO ET AL.	
	Examiner	Art Unit	
	Ganapathy Krishnan	1623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9, 19-27, 37-45, 55-66, 68, 70, 72, 74, 76 and 103-114 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 19-27, 37-45, 55-66, 68, 70, 72, 74, 76 and 103-114 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2/17/05</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

The application has been withdrawn from issue and prosecution reopened in view of the reference cited in applicants IDS filed February 17, 2005. Claims 1-9, 19-27, 37-45, 55—66, 68, 70, 72, 74, 76 and 103-114 are pending in the case.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2 and 4-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 2 and 4-6 recite the terms lower alkyl and lower alkoxy. The term "lower" in claim 2 and 4-6 is a relative term which renders the claim indefinite. The term "lower" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The specification (pages 4-5) just gives examples of some lower alkyl and alkoxy groups but does not define the carbon chain length of the said groups that applicants consider as lower. The claims have to define the said terms.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 1623

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-7, 37-45, 55, 62-65, 70, 72, 76 and 111 are rejected under 35 U.S.C. 102(e) as being anticipated by Wengel et al (US 6,794,499).

Wengel et al teach monomeric locked nucleic acids of formula IIa (col. 27, line 66 through col. 28, line 59). In the monomer of formula IIa, X is oxygen, B is a base selected from thymine, cytosine, uracil adenine and guanine, R^{1*} , R^2 and R^3 are hydrogen, R^{2*} and R^{4*} together designate a biradical from $-(CH_2)_{0-1}-O-(CH_2)_{1-3}-$. Q in formula IIa of Wengel is Protected $-O-$ and R^{3*} is Q^* , which is designated as Act-O, R^5 and R^{5*} are hydrogen (col. 28, lines 17-28). In formula IIa of Wengel, for the definition of R^{2*} and R^{4*} as a biradical, in the formula $-(CH_2)_{0-1}-O-(CH_2)_{1-3}-$ if the subscript after the first methylene group is zero and the subscript after the second methylene group is 2 then the biradical formula for R^{2*} and R^{4*} reduces to $-O-(CH_2)_2-$. This is same as the biradical A- $(CH_2)-O-$ in formula (1) of instant claim 1 wherein A is a methylene group. Q and Q^* are protected hydroxyls, mercapto, protected mercapto, amino, alkoxy groups, phosphate, phosphoramidite, alkylthio, hydrogen, halogen and cyano (col. 26, line 10 through col. 27, line 57). Q and Q^* are same as R^1 and R^2 in formula (1) of instant claim 1. This teaching of Wengel is seen to read on instant claims 1-7, 37-45, and 55.

Wengel also teaches oligomers of the compounds of his invention (col. 11, lines 1-15) wherein the oligomers comprise 1-10000 LNA's of general formula I (col. 20, lines 1-25) and pharmaceutical composition comprising the oligomers(col. 41, lines 7-10) in Tris-Hcl buffer

Art Unit: 1623

(col. 123, lines 31-42). This teaching of Wengel is seen to read on instant claims 62-65, 70, 72, 76 and 111.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3-9, 19-27, 37-45, 55-61, 66, 68, 70, 72, 74, 76, , 103-110 and 112-114 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wengel et al (US 6,794,499).

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Art Unit: 1623

Instant claim 1 is drawn to a compound of formula (1). Claim 55-61 are drawn to specific compounds. Claim 62 is drawn to an oligonucleotide of formula (2). Claim 72 is drawn to a pharmaceutical composition of an oligonucleotide comprising at least one unit of formula (2). The rest of the dependent claims recite limitations drawn to the base, and the groups R^1 and R^2 and specific compounds.

Wengel et al teach monomeric locked nucleic acids of formula IIa (col. 27, line 66 through col. 28, line 59). In the monomer of formula IIa, X is oxygen, B is a base selected from thymine, cytosine, uracil adenine and guanine, R^{1*} , R^2 and R^3 are hydrogen, R^{2*} and R^{4*} together designate a biradical from $-(CH_2)_{0-1}-O-(CH_2)_{1-3}-$. Q in formula IIa of Wengel is Protected $-O-$ and R^{3*} is Q^* , which is designated as Act-O, R^5 and R^{5*} are hydrogen (col. 28, lines 17-28). In formula IIa of Wengel, for the definition of R^{2*} and R^{4*} as a biradical, in the formula $-(CH_2)_{0-1}-O-(CH_2)_{1-3}-$ if the subscript after the first methylene group is zero and the subscript after the second methylene group is 2 then the biradical formula for R^{2*} and R^{4*} reduces to $-O-(CH_2)_2-$. This is same as the biradical $A-(CH_2)-O-$ in formula (1) of instant claim 1 wherein A is a methylene group. Q and Q^* are protected hydroxyls, mercapto, protected mercapto, amino, alkoxy groups, phosphate, phosphoramidite, alkylthio, hydrogen, halogen and cyano (col. 26, line 10 through col. 27, line 57). Q and Q^* are same as R^1 and R^2 in formula (1) of instant claim 1.

Wengel also teaches oligomers of the compounds of his invention (col. 11, lines 1-15) wherein the oligomers comprise 1-10000 LNA's of general formula I (col. 20, lines 1-25) and a composition comprising the oligomers in Tris-Hcl buffer (col. 123, lines 31-42). Wengel also teaches in general that the nucleobase in his invention covers all naturally occurring bases and

Art Unit: 1623

non-naturally occurring bases and gives several examples (col. 11, line 48 through col. 12, line 3).

However, Wengel does not specifically teach the limitations like the various substituted bases, specific groups like 2- and 4-chlorophenyl phosphate groups, etc., recited in the instant claims.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the monomers and oligomers of instant formula (1) and (2) and their compositions and the other specific compounds recited in the instant claims since structurally related analogs and their compositions are seen to be taught in the prior art.

One of ordinary skill in the art would be motivated to make the compounds and compositions containing the compounds as instantly claimed in order to make analogs that have desirable properties because according to Wengel these locked nucleoside analogs exhibit highly desirable and useful properties and exhibit higher thermostability compared to the normal nucleic acids and makes them useful as diagnostic and therapeutic agents (abstract).

Conclusion

Claims 1-9, 19-27, 37-45, 55—66, 68, 70, 72, 74, 76 and 103-114 are rejected

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ganapathy Krishnan whose telephone number is 571-272-0654. The examiner can normally be reached on 8.30am-5pm.

Art Unit: 1623

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shaojia A. Jiang can be reached on 571-272-0627. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

GK

A handwritten signature in black ink, appearing to read 'Shaojia Jiang', is written over a horizontal line.

Shaojia Jiang
Supervisory Patent Examiner
Art Unit 1623